Research & Development
Ultrasonic Technology / Fingerprint recognition

DATA SHEETS

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OPKO

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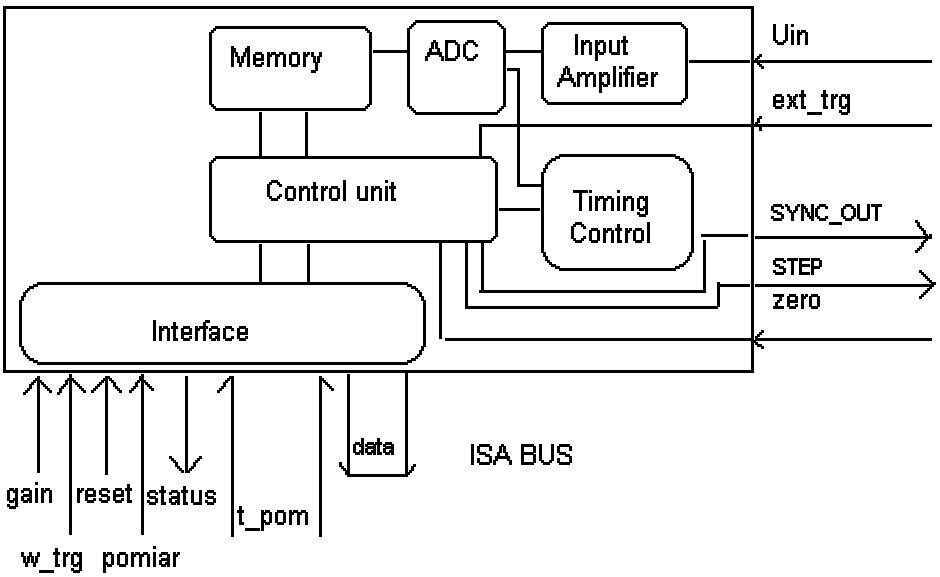
Automatic Oscilloscope Card OPKO-1/80

OPKO-1/80 is particularly well suited for ultrasonic measurements as well as other kinds of measurements which employ mechanical scanning elements or multiplexed channels (the card is capable of controlling such devices). OPKO-1/80 is a short (8-bit) ISA card and can be installed in a standard PC computer.

Block diagram of the card:



gain	
Uin	gain control
w_trg	input signal
reset	trigger select
status	card reset
t_pom	measurement status
pomiar	measurement time control
EXT_TRG	measurement start
TTL	external trigger
SYNC_OUT	pulse generator control
TTL	step motor control
STEP TTL	position marker
ZERO TTL	

Technical data

- A/D converter 8 bits, 80 MHz sampling frequency
- Data buffer 256 or 512 bytes (software selected), about 21000 bytes for periodic signal
- input amplifier gain: x1 or x2 (software selected), bandwidth 25MHz
- input voltage AC, max. 1V p-p

- input impedance 50W or 1MW (jumper)
- post-trigger (t_pom) 0 - 255ms (software selected)
- external trigger max. 2kHz

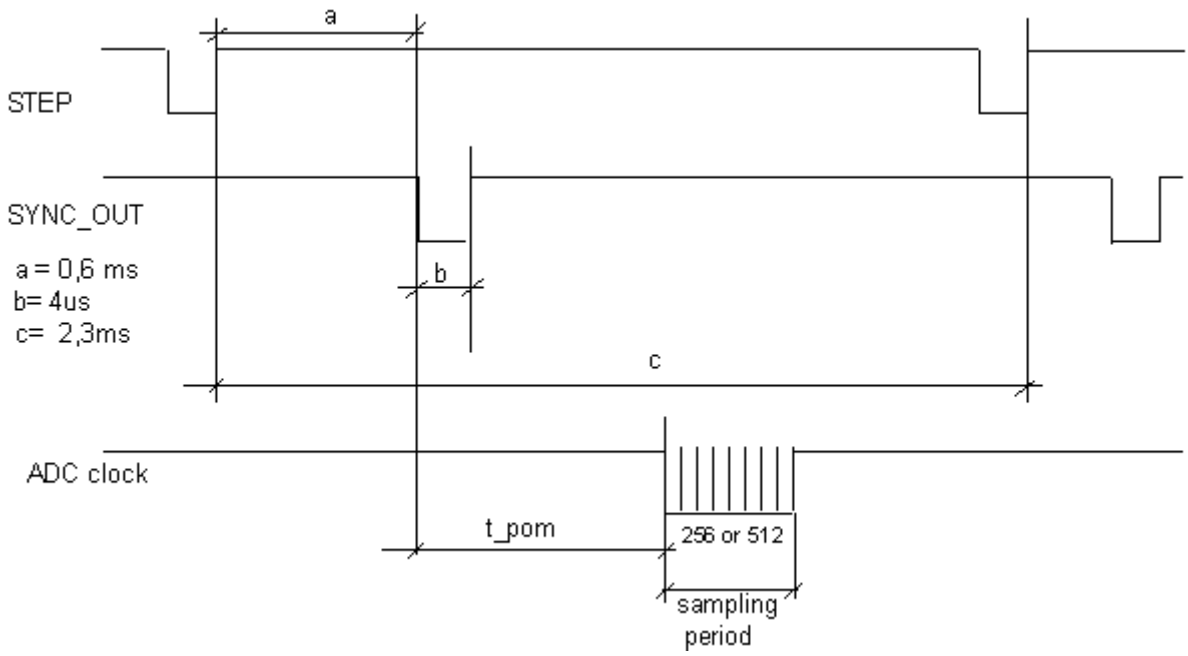
The card generates the following control signals:
- SYNC_OUT - pulse generator control signal;
- STEP step motor control signal;

and has the following input signals:
- EXT_TRG external trigger;
- ZERO position marker signal (e.g. generated by an optical sensor).

One of the most important features of the card is a precise synchronization between the transmitter trigger signal SYNC_OUT and the moment when the sampling of the input signal starts.

This time (t_pom) is software programmable in the range of 0 - 255ms with a resolution of 1ms and has stability within the range of 1ns. It is particularly important in the case of scanning devices, since it allows to achieve a very small time skew between different positions (channels). 1ns would correspond to a clock frequency of 1GHz which is much higher than the actual frequency used.

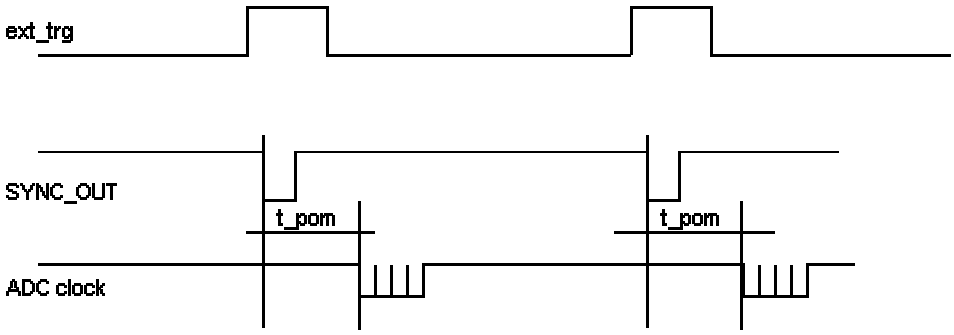
Automatic measurement mode



The card in its standard version can operate with a moving measurement head (rotating or moving linearly) as well as with a multiplexer circuit switching measurement channels. It can control a step motor (through a driver unit).
- ZERO is a marker of the reference position of the measurement head;

- STEP is a signal controlling the step motor driver unit or the multiplexer;
- SYNC_OUT triggers the transmitter circuit, it is synchronized with the STEP signal in such a way that
a pulse on the STEP signal is followed by a delayed pulse on the SYNC_OUT signal as shown in a figure below.
The delay is introduced in order to eliminate potential interference from the step motor.

Oscilloscope mode



In this mode, for each EXT_TRG pulse, a single SYNC_OUT pulse is generated (the STEP signal is not generated). This permits a precise synchronization with the clock signal generated on the card and therefore guarantees good repeatability of measurement results. In the case when the measurement circuit cannot be triggered, the repeatability of measurement results corresponds only to the clock resolution (12ns).

The card can also work in an automatic trigger mode. In this mode, the card automatically generates the SYNC_OUT signal (approximately every 2ms) and performs the measurement cycle.It allows the observation of waveforms triggered by SYNC_OUT.

In the current version of the card, there is no analogue trigger input and this function is implemented in software.

The card is programmed through the I/O operations. The STATUS and ZERO signals can be checked by reading the status register. The STATUS signal can also generate an interrupt.

Thanks to the feature which allows the I/O base address change, a number of our cards can work in a single computer.

All the control signals generated by the card can be modified according to specific customer requirements. For instance, a number of SYNC_OUT pulses can be generated between consecutive STEP pulses, the frequency of the STEP pulses can be modified etc.

Included with the card is software which operates in both the automatic and oscilloscope mode. It also has a spectrum analysis function.

Future versions of the card will include:

1. 16-bit data bus and a programmable sampling frequency;
2. Data buffer located in the memory address area of a PC;
3. Large data buffer which will enable a fully autonomous measurement cycle;
4. Increased sampling frequency to at least 200 MHz;
5. PCI interface.